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Before the
Federal Communications Commission
Washington, D.C. 20554

DISC-100-27

ET Docket No. 92-28

In the Matter of

Amendment of Section 2.106 of the
Commission's Rules to Allocate the
1610-1626.5 MHz and the 2483.5-2500 MHz
Bands for Use by the Mobile-Satellite Service
Including Non-Geostationary Satellites

MEMORANDUM OPINION AND ORDER

Adopted: February 24, 1995; Released: March 20, 1995

By the Commission:

INTRODUCTION

1. By this action, we respond to a Petition for Reconsideration of the *Report and Order (R&O)*¹ submitted by Loral Qualcomm Satellite Services, Inc. (LQSS). We clarify that the R&O allocated the 1610-1626.5 MHz (1.6 GHz) and 2483.5-2500 MHz (2.4 GHz) bands for geostationary orbit (GSO) and non-geostationary orbit (low-Earth orbit or LEO) mobile-satellite service (MSS) use, but made no finding as to whether both types of systems would be authorized. We also clarify the meaning of international footnotes RR753F and RR731E, but defer to the 1995 World Radiocommunication Conference (WRC-95) action on modification of these footnotes.² Finally, we will explore with the National Telecommunications and Information Administration (NTIA) the possibility of making spectrum in Government or shared Government/non-Government bands available to assist in satisfying MSS/radiodetermination satellite service (RDSS) feeder link requirements.

BACKGROUND

2. In the R&O, we allocated the 1.6 and 2.4 GHz bands for LEO and GSO MSS on a co-primary basis with the existing RDSS. We stated that this allocation will support the growing demand for mobile communications and per-

mit the introduction of new satellite services -- including voice, facsimile, and data applications -- and facilitate the availability of such services on a worldwide basis. We further noted that the allocation is identical to that adopted internationally by the 1992 World Administrative Radio Conference (WARC-92).

3. In the R&O, we also adopted international coordination and notification procedures specified by WARC-92. In particular, we adopted International Telecommunication Union (ITU) footnote 753F (RR753F), which deals with coordination between MSS/RDSS space stations and terrestrial services in the 2.4 GHz space-to-Earth band; and ITU Footnote 731E (RR731E), which deals with coordination between MSS/RDSS Earth stations and terrestrial services in the 1.6 GHz Earth-to-space band.³ Additionally, we declined requests by LEO MSS proponents to propose specific new allocations for feeder links,⁴ stating that existing fixed-satellite service (FSS) bands can be used for this purpose.

4. On March 30, 1994, LQSS filed a Petition for Clarification and Partial Reconsideration of the R&O.⁵ LQSS generally supports our co-primary MSS and RDSS allocation at 1.6 and 2.4 GHz. However, it contends that we should clarify and modify four aspects of the R&O in order to promote the timely introduction of new satellite services and to make them of optimum benefit to the public. Specifically, LQSS requests that we:

- clarify that the R&O was intended only to allocate spectrum for MSS and does not establish system eligibility (i.e., LEO or GSO) requirements for MSS licensees;
- increase the power flux density (PFD) values in RR753F and clarify that these values represent thresholds that determine when coordination with terrestrial users is required, rather than absolute limits;
- modify RR731E to apply a -15 dBW/4 kHz limit on effective isotropic radiated power to all MSS uplinks and eliminate the part of the footnote regarding protection of aeronautical radionavigation systems; and
- identify spectrum below 15 GHz that can be used for LEO MSS feeder links.

DISCUSSION

5. *Licensee Eligibility.* LQSS requests that we clarify that the R&O addressed matters related only to the allocation of spectrum and did not address the eligibility of different types of systems to operate in that spectrum. It notes that in the *Notice of Proposed Rule Making (Notice)* in CC

¹ See *Report and Order*, ET Docket No. 92-28, 9 FCC Rcd 536 (1993).

² We note that Loral Qualcomm is participating in industry advisory panels that are in the process of developing the U.S. position for WRC-95.

³ We allocated the 2.4 GHz band on a primary basis for space-to-Earth operations and the 1.6 GHz basis on a primary basis for Earth-to-space operations. Additionally, we allocated the 1613.8-1626.5 MHz portion of the 1.6 GHz band on a secondary basis for space-to-Earth operations to provide for potential bi-directional use in this portion of the band.

⁴ Feeder links interconnect a mobile satellite system with

other communications networks or user transceivers by means of one or more central Earth stations. Because these Earth stations are at fixed locations, feeder links use frequencies allocated to the fixed-satellite service.

⁵ LQSS is one of five applicants seeking authority to construct, launch, and operate a LEO mobile-satellite service. The other applicants are Constellation Communications, Inc. (Constellation), Ellipsat Corporation (Ellipsat), Motorola Satellite Communications Inc., and TRW, Inc. (TRW). Further, AMSC Subsidiary Corporation (AMSC) is seeking authority to operate a GSO system in these bands.

Docket No. 92-166 subsequent to the *R&O*, we proposed MSS service rules that recognized that LEO systems have a technological advantage over GSO systems.⁶ LQSS therefore maintains that we should clarify that the *R&O* did not find that it is in the public interest to license both LEO and GSO systems in the 1.6 and 2.4 GHz bands.

6. In its response, AMSC opposes any restrictions on GSO use of the 1.6 and 2.4 GHz bands. However, it concurs with LQSS that the MSS service rules proceeding is the appropriate forum to address the eligibility issue.

7. As LQSS contends, we made no finding on the desirability of LEO versus GSO systems in the *R&O*. Further, in the recent *Report and Order* in the service rules proceeding, we required MSS systems licensed in the 1.6 and 2.4 GHz bands to operate in non-geostationary orbits.⁷ Accordingly, we are clarifying that in the *R&O* we addressed matters related only to the allocation of spectrum and did not address the eligibility of different types of MSS systems to operate in that spectrum.

8. *International Footnote RR753F*. WARC-92 added RR753F worldwide in the 2.4 GHz band.⁸ In the *R&O*, we adopted this footnote domestically by including it in our Table of Frequency Allocations.⁹ LQSS urges that we increase the PFD limits prescribed by this footnote and clarify that these limits are only coordination thresholds, rather than absolute limits.¹⁰ LQSS contends that RR753F imposes time-consuming and unnecessary coordination with terrestrial services. It states that the less restrictive PFD values it proposes would increase the availability and utility of MSS; and that clarifying that the PFD values are not absolute limits would eliminate inefficient coordination.

⁶ See *Notice of Proposed Rule Making*, CC Docket No. 92-166, 9 FCC Rcd 1094 (1994), at para. 22.

⁷ See *Report and Order*, CC Docket No. 92-166, 9 FCC Rcd 5936 (1994).

⁸ RR753F states: "The use of the band 2483.5-2500 MHz by the mobile-satellite and the radiodetermination-satellite services is subject to the application of the coordination and notification procedures set forth in Resolution 46. Coordination of space stations of the mobile-satellite and radiodetermination-satellite services with respect to terrestrial services is required only if the power flux-density produced at the Earth's surface exceeds the limits in No. 2566. In respect of assignments operating in this band, the provisions of Section II, paragraph 2.2 of Resolution 46 shall also be applied to geostationary transmitting space stations with respect to terrestrial stations."

RR2566 states: "The power flux-density at the Earth's surface produced by emissions from a space station, including emissions from a reflecting satellite, for all conditions and for all methods of modulation, shall not exceed the following values:

-152 dB(W/m²) in any 4 kHz band for angles of arrival between 0 and 5 degrees above the horizontal plane;

-152 + 0.5(9-5) dB(W/m²) in any 4 kHz band for angles of arrival 9 (in degrees) between 5 and 25 degrees above the horizontal plane;

-142 dB(W/m²) in any 4 kHz band for angles of arrival between 25 and 90 degrees above the horizontal plane."

See *International Radio Regulations* RR753F and RR2566.

⁹ See 47 C.F.R. § 2.106.

¹⁰ LQSS proposes that we replace the values in RR2566 with the following:

-152 dB(W/m²) in any 4 kHz band for angles of arrival between 0 and 5 degrees above the horizontal plane;

9. In its response, AMSC disagrees that the PFD values should be increased. According to AMSC, there is no technical basis for increasing these values. However, both AMSC and TRW support LQSS's request to clarify that these values represent only coordination thresholds.

10. In the *R&O*, we observed that the international footnotes adopted for the 2.4 GHz band by WARC-92 were intended to form the basis for international notification and coordination of various satellite systems, and to ensure that new and existing systems are afforded protection from harmful interference.¹¹ We therefore adopted these footnotes domestically, including RR753F. Notwithstanding LQSS's concern that the PFD values prescribed by RR753F may be excessively conservative, we believe that the proper forum for modifying these limits is WRC-95. We concur with LQSS and commenting parties, however, that these values were not intended as absolute limits by WARC-92 and should not be viewed as absolute limits for our domestic rules. Accordingly, we are clarifying that the PFD values prescribed by RR753F are coordination thresholds that may be exceeded with the consent of all affected administrations in these bands.

11. *International Footnote RR731E*. LQSS requests that we clarify that RR731E does not entitle aeronautical radionavigation services to levels of protection beyond that which can be achieved with the allowable EIRP limits.¹² It asks that we accomplish this either by deleting RR731E in its entirety or by implementing a U.S. footnote that applies the -15 dBW/4 kHz EIRP limit to all MSS uplinks and deletes the part of the international footnote regarding protection of aeronautical radionavigation systems. LQSS maintains that RR731E was adopted by WARC-92 to protect Swedish radar systems and the Russian Federation

-152 + 0.65(9-5) dB(W/m²) in any 4 kHz band for angles of arrival 9 (in degrees) between 5 and 25 degrees above the horizontal plane;

-139 dB(W/m²) in any 4 kHz band for angles of arrival between 25 and 90 degrees above the horizontal plane.

In our proceeding to develop U.S. proposals for WRC-95, LQSS also urges that we increase the PFD values. See comments of LQSS to the *Notice of Inquiry*, IC Docket No. 94-31, 9 FCC Rcd 2430 (1994).

¹¹ See note 1, *supra*.

¹² RR731E states: "The use of the band 1610-1626.5 MHz by the mobile-satellite service (Earth-to-space) and by the radiodetermination-satellite service (Earth-to-space) is subject to the application of the coordination and notification procedures set forth in Resolution 46 (WARC-92). A mobile earth station operation in either of the services in this band shall not produce an e.i.r.p. density in excess of -15 dB(W/4 kHz) in the part of the band used by systems operating in accordance with the provisions of No. 732, unless otherwise agreed by the affected administrations. In the part of the band where such systems are not operating, a value of -3 dB(W/4 kHz) is applicable. Stations of the mobile-satellite service shall not cause harmful interference to, or claim protection from, stations in the aeronautical radionavigation service, stations operating in accordance with the provisions of No. 732 and stations in the fixed service operating in accordance with the provisions of No. 730." RR 732 states: "The band 1610-1626.5 MHz is reserved on a worldwide basis for the use and development of airborne electronic aids to air navigation and any directly associated ground-based or satellite-borne facilities. Such satellite use is subject to agreement obtained under the procedure set forth in article 14."

GLONASS system¹³ from interference. However, it states that the Swedish radar systems are of limited scope and would not be adversely affected by MSS, and that discussions have taken place between the United States and the Russian Federation regarding moving GLONASS to other bands. Thus, LOSS asserts that RR731E is unnecessary. Alternatively, LOSS proposes that the last sentence of RR731E, which deals with interference protection for aeronautical systems, be deleted.

12. In its response, AMSC supports LOSS's proposal to modify RR731E. TRW states that the footnote should be interpreted simply to require coordination when the applicable EIRP values are exceeded.

13. We note that RR731E was one of the bases for the international agreement on the use of the 1.6 GHz band for the implementation of new mobile-satellite services.¹⁴ Although LOSS may be correct with respect to its arguments regarding the Swedish radar systems and the Russian Federation GLONASS system, other international concerns remain. Therefore, we believe that the proper forum for modifying this footnote is WRC-95.¹⁵ However, consistent with our interpretation of RR753F, we clarify that the EIRP values may be exceeded with the consent of all affected administrations in these bands.

14. *Frequency Bands for Feeder Links.* LOSS requests that we identify specific frequency bands below 15 GHz for MSS feeder link operations. LOSS states that in their license applications, Ellipsat and Constellation, as well as LOSS, urged that we make available the 5150-5250 MHz (5 GHz) band for feeder links. LOSS states that the R&O fails to evaluate the need for feeder links or to assess the suitability of various FSS bands for such use. It further states that the 27.5-30 GHz FSS band, which we have stated may satisfy uplink feeder link requirements,¹⁶ is unlikely to do so because the band will be crowded with other users. LOSS concludes that we should identify specific bands below 15 GHz that can be used for feeder links. TRW concurs with this assessment.¹⁷

15. In the R&O, we noted that there may be difficulties in using for feeder links bands that are congested with GSO FSS systems, and that LEO MSS feeder links would need to operate in bands that are not heavily used by such systems. We stated that we would be exploring all options to ensure that adequate unencumbered spectrum is avail-

able for feeder link requirements. In a recent *Report to NTIA*, we recommended that the shared Government/non-Government bands at 3600-3700 and 5850-5925 MHz be made available for exclusive non-Government use.¹⁸ We noted that the 3600-3700 MHz band was identified in our negotiated rule making¹⁹ regarding MSS above 1 GHz as one of the more likely candidates for MSS/RDSS feeder link spectrum.²⁰ We intend to explore with NTIA the possibility of feeder link spectrum being made available from these and other existing Government or shared Government/non-Government bands that may be reallocated for exclusive non-Government use.

ORDERING CLAUSE

16. Accordingly, IT IS ORDERED, that the Petition for Clarification and Partial Reconsideration submitted by Loral Qualcomm Satellite Services, Inc. IS GRANTED to the extent indicated herein, and IS DENIED in all other respects. This action is taken pursuant to Sections 4(i), 303(c), (f), (g), and (r), and 309(a) of the Communications Act of 1934, as amended, 47 U.S.C. Sections 154(i), 303(c), (f), (g), and (r).

FEDERAL COMMUNICATIONS COMMISSION


William F. Caton

William F. Caton
Acting Secretary

¹³ GLONASS is a satellite system that is under consideration for use with the U.S. Global Position Satellite (GPS) for development of a Global Navigation Satellite System (GNSS).

¹⁴ See *Final Acts WARC-92*. We note however that the United States took a reservation to the WARC-92 MSS decisions. The U.S. stated: "In the view of the United States of America, this Conference has unduly delayed the availability of sufficient spectrum for the mobile-satellite service in the range 1-3 GHz on an international and regional basis. Therefore, the United States of America reserves its right to take any necessary steps to meet the needs of the mobile-satellite service in this band". The U.S. has indicated that it plans to seek clarification of the language of RR731E at WRC-95. See *Second Notice of Inquiry*, IC Docket No. 94-31, adopted January 30, 1995 and released January 31, 1995.

¹⁵ As previously discussed, LOSS is participating in our WRC-95 proceeding, and has provided comments on modifying RR731E.

¹⁶ See *Second Notice of Proposed Rule Making*, CC Docket No. 92-297, 9 FCC Rcd 1394 (1994), at para. 22.

¹⁷ The various proponents are split as to whether they prefer spectrum below 15 GHz (Constellation, Ellipsat, and Loral) or

whether they prefer feeder link spectrum in the 27.0-29.5 GHz band (Motorola and TRW). This consideration is a function of their respective system designs. The feeder link issues also are being considered by the Commission in preparing to recommend U.S. positions for the WRC-95. See *Second Notice of Inquiry*, IC Docket No. 94-31, FCC 95-36, released January 31, 1995.

¹⁸ See *Report from the Federal Communications Commission to Ronald H. Brown Secretary, U.S. Department of Commerce Regarding the Preliminary Spectrum Reallocation Report*, FCC 94-213, released August 9, 1994, at paras. 66 and 69. We are placing a copy of this *Report* into ET Docket No. 92-28. Although the Federal Aviation Administration (FAA) has proposed to implement new aircraft navigational aids in the 5 GHz band, we note that ITU Task groups 4/5 and 8/3 are attempting to further evaluate the 5 GHz band for possible use by MSS feeder links and to identify further available frequencies that might accommodate existing or future MSS feeder link operations.

¹⁹ See *Report of the MSS Above 1 GHz Negotiated Rulemaking Committee*, released April 6, 1993.

²⁰ *Id.*, at para. 66.